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Cash Flow — If It's Not the Bottom Line, What Is?

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ABSTRACT

A cash based funds flow model is used to discriminate between failed and nonfailed companies. We discovered cash flow from operations does not provide a reliable signal for classifying companies, which supports recent findings of Casey and Bartczak. Our analysis shows funds flow components or financial ratios provide dependable signals for classifying companies. Finally, we found a combination of funds flow measures and ratios with particular emphasis on dividends, investment and receivables supply management reliable information for judging the condition of a company's financial health.

CASH FLOW--IF IT'S NOT THE BOTTOM LINE, WHAT IS?

Scientists, astronauts, navigators, meterologists and members of the corporate management team have a common goal of continuously searching for signals that will aid them in predicting what lies ahead. A primary concern of the above professionals is the reliability of the signals being received. For example, corporate management, financial executives, accountants, credit analysts and financial analysts have held the view that past cash flow trends provide reliable signals for predicting a firm's future success or failure. In what may have been a surprising finding, Casey and Bartczak (CB) [2] reported cash flow from operations (CFO) was not a reliable measure for predicting corporate bankruptcy. CB's research found financial ratios provided superior information to CFO for explaining financial failure. They stated there are many other factors that may signal failure, such as company indebtedness, lack of access to financial markets, low salability of capital assets and a low reservoir of liquid assets.

In studying the financial explanations of bankruptcy, we selected a broader base of cash flow components than CB. Although our research findings are not directly comparable to CB's due to differences in objectives and experimental design, our eclectic cash flow measures provide unique insights into the prediction of financial failure.

Cash Based Flows

We chose a cash based funds flow model to explain corporate failure because integrated cash flow information reflects the outcome of major financial decisions of management. Cash flows are considered to be more sensitive to changes in short term trends than information based on accrual accounting assumptions. Finally, leading valuation theories are based on discounted future cash flows.

Previous bankruptcy studies have used financial ratios to predict financial failure, but the theoretical rationale for selecting specific ratios has not been explicitly developed. This ad hoc search process for selecting ratios has resulted in each study finding a unique set of ratios for predicting financial failure. To offset the criticism raised concerning these ad hoc procedures, we selected cash flow components that utilize financial information available in a firm's balance sheets and income statements. Our concern for cash flow measures caused us to decompose cash based accounting information into functionally oriented components. In contrast, CB were only interested in the classification ability of CFO and they utilized the traditional working capital based funds flow model to calculate the CFO measure.

THE MODEL

Rationale

In an accounting context, cash inflows equal cash outflows. The level and speed of the cash flows reflect managements' operating, investment and financing decisions. The distributions of the components generating cash inflows and outflows are signals that reflect the resource allocation decisions of management. The trends of the changes in cash inflow and outflow components provide measures for discriminating between financially successful and financially failing firms.

Components

The model we use to identify funds flow measures was developed by Erich Helfert [4]. After extensive use of Helfert's model, we redesigned

it to have eight major components. The eight net funds flow components are operations (NOFF), working capital (NWCFF), financial (NFFF), fixed coverage expenses, i.e., interest and lease payments (FCE), capital expenditures (NIFF), dividends (DIV), other asset and liability flows (NOTHER) and the change in cash and marketable securities (CC). The interrelationship among the components is quite complex. Excepting changes in cash and marketable securities, a source (S) would be a positive number and a use (U) would be negative. As a first cut, the following equation presents a formulation of the cash based funds flow model and the most likely source/use classification of each component for a financially healthy firm.

$$\underset{(S)}{\overset{+}{NOFF}} + \underset{(U)}{\overset{-}{NWCFF}} + \underset{(S)}{\overset{+}{NFFF}} + \underset{(U)}{\overset{-}{FCE}} + \underset{(U)}{\overset{-}{NIFF}} + \underset{(U)}{\overset{-}{DIV}} + \underset{(U)}{\overset{-}{NOTHER}} - \underset{(U)}{\overset{+}{CC}} = 0$$

The accounting convention underlying the funds statement results in total net inflow of funds (TNIF) being equal to the absolute value of total net outflow of funds (TNOF). We have simplified the notation by substituting the expression total net cash flow (TNCF) for TNIF and TNOF. Thus by dividing each funds flow component by TNCF, one can determine the percentage each component contributes to the total.

Example

An example that compares Deere & Company to Massey-Ferguson (MF) illustrates how the trends of funds flow components aid in determining if a company is financially healthy or weak. Performance trends for the period 1978-1982 of the eight funds flow components are presented in Exhibit 1.

The trend of the net operating funds flow components are located in the upper left hand corner of Exhibit 1. The graphic presentation shows that approximately 80% to 90% of Deere's total net inflow came from operations in three years and only 45% to 55% was generated in the other two years. Although Deere's operating inflow component was relatively erratic, its level was always markedly greater than Massey Ferguson's. Massey's operating flows were 62% of total inflows in 1979 in contrast to being -28% of total outflows in 1982. Net outflows are shown as negative values in Exhibit 1. The trend of the net operating flows was declining for both companies, but is is apparent that Deere, the financially stronger company, received a significantly higher percent of their inflows from operations.

Frequently the largest percentage of a firm's total outflows go to capital investment. However, Exhibit 1 shows the percentage of Deere's total net outflows going to investment declined from -47% in 1979 to -12% in 1982. For Massey Ferguson the percentage of total outflow going to investment dropped from -24% in 1978 to approximately zero in 1980 and remained at that level through 1982. Graphically, Massey's decline in investment can be related to the shortage of operating inflows available for investment. The decrease in investment at Deere was also related to decline in operating inflows.

The interdependence among the cash flow components is most evident in the net financing flow component (NFFF), which measures the increase or decrease in total debt and common stock. The path of the net financing flows for Deere in Exhibit 1 reflects an offset to the pattern of operating inflows. When net operating flows declined at Deere,

the management increased outside financing in order to maintain its on-going operations and dividends. Exhibit 1 highlights Massey's heavy commitment to outside financing in 1979-1980 and a dramatic change in 1981.

The net working capital path has a unique significance for Deere and Massey Ferguson. Although net operating inflows and net investment outflows were declining as a percentage of the total, net working capital at Deere ranged from -15% to -30% of total net outflow in three of the five years. In 1979 it was a small outflow and in 1981 a small inflow. In contrast, at Massey Ferguson net working capital was a major inflow in three of the five years. By disaggregating the five components of working capital a better understanding of the funds flow picture emerges. Exhibit 2 presents the five components of net working capital. Short-term borrowing is included in Exhibit 2, but by definition it is a financing flow. In 1981 when Massey's fixed coverage expenses soared and the short-term borrowing had to be repaid, management reduced inventory and receivables and they respectively composed 71% and 5% of total net inflows. In 1982 receivables composed 66% of total net inflows and inventories 28%. In comparison the change in receivables at Deere were a primary net outflow in each year except 1979 and the change in inventories were a small inflow in three of the five years. The key observation is that receivables and inventories were major inflows for Massey when the financial crisis hit. In contrast Deere's receivables required a major outflow of funds in four of the five years.

Exhibit 1 shows dividends at Deere represented between -9% and -16% of the total outflow of funds. In contrast, the dividend outflow as a percentage of the total at Massey ranged from -1% to -9% during the period, which was significantly smaller than the dividend outflow at Deere. Massey was paying dividends to the Canadian government for external financing received throughout the period.

The percentage of total outflow needed to cover fixed financial obligations highlights a major difference between Deere and Massey Ferguson. The largest outflow of funds for Massey was to meet their fixed coverage expenditures. Exhibit 1 shows fixed coverage ranged from -50% to -88% of the total outflow of funds. Fixed coverage expenditures at Deere ranged from -15% in 1979 to about -30% in 1981.

Research Study

Our analysis uses twelve funds flow measures to classify failed and nonfailed companies. We substituted the five working capital components for the single net working capital component, omitted the component CC/TNF to avoid a statistical problem of overidentification and added a size measure, total net flows as a percentage of total assets, (TNF/TA). The analyses uses these twelve funds flow components to compare the performance of 33 financially healthy companies to 33 bankrupt firms for a period up to three years before failure. The failed companies were selected from the 1981 Standard and Poor's COMPUSTAT Annual Industrial Research File. Initially there were 114 failed companies for the period 1970-1981, but only 33 of these failed companies had complete financial data required for this study. Each

failed company was matched with a nonfailed company in the same industry and approximately the same size in both assets and sales. Our analysis examined the results for periods of one, two, and three years before failures and an average of the three years. We are reporting the results of one year before failure and the mean of the three years.

Findings

The mean and deviation of each cash flow ratio for the 33 failed and nonfailed companies are reported in Exhibit 3. A brief review of the data indicates there is generally a marked difference between the means of the bankrupt companies and the financially healthy companies. For example using the one year before failure data, the means of the operating inflows are 55.6% of total inflow for the nonfailed companies and 16.3% for the failed companies; the means of the total outflow going to investment are -36.7% and -16.3%, respectively; dividends are -9.2% and -1.8% of the outflow, respectively; and receivables are -16.9% of total outflow for the nonfailed companies and 10.0% of total inflow for the bankrupt companies. The standard deviations are substantially larger for the funds flow components of the failed companies. It is not uncommon, especially among the working capital components, for the mean of the failed companies to be an inflow and the mean of the nonfailed to be an outflow.

A conditional probability model called probit generates coefficients from the funds flow components and uses them to predict the probability of failure or nonfailure of the 66 companies. The classification results are reported in Exhibit 4. They show 79% of the failed

companies are classified correctly using data that are either one year before failure or a mean of three years before failure. The model classified 88% of the financially healthy companies correctly using data one year before failure and 79% with the three year average.

The probit analysis calculates the weight each of these funds flow component contributes to the overall prediction of failure or non-failure. The probit coefficients are similar to the coefficients that compose the Z score developed by Altman [1] and they are reported in Exhibit 5. Using the one year before failure data, we discovered the investment, dividend and receivables components were statistically significant at the 5% level of confidence. Figure 1 provides the distribution of these three funds flow components. The distribution of the percentage of total outflow going to capital investment reveals that financially healthy companies invest a substantially higher percentage of funds in plant and equipment than the firms that failed. The economic rationale underlying this finding makes it intuitively appealing.

The distribution of the outflow of funds to dividends are in Figure 1 and they are left skewed. For the financially healthy companies the average dividend composed -9.2% of the total outflow and ranged from 0 to -40% with six of the companies paying no dividends. The dividend component for the failed companies ranged between 0 and -25%, and on average was -1.8% of total outflow with 23 of the companies not paying dividends. In general, failing firms tend to experience a shortfall of inflows from operations, thereby causing a reduction in dividend payments.

When classifying the performance of accounts receivables, Figure 1 shows the financially healthy companies were investing in receivables while the bankrupt firms were reducing the level of receivables in order to generate cash inflows. On average approximately -17% of the outflow went to finance receivables for the nonfailed firms, while 10% of total cash inflow for failed companies came from receivables. The cash flows related to receivables are vastly different between the financially healthy and failed firms.

Using a three year mean for each component indicates the dividend component is again significant at the 5% level of confidence in classifying failed and nonfailed companies. The analysis also found the ratio of total net flow/total assets, a measure of cash flow as a percent of total assets, was statistically significant. The receivables and investment components were not significant because the distributions of the failed companies' ratios were disbursed across a wide range.

The findings clearly show that regardless of time periods used before failure, dividends are important in classifying failed and nonfailed companies. The stability of net cash flow, receivables and investments change dramatically as a company approaches failure. That is, receivables and investment components do not provide reliable signals for classifying failure two or three years before the event, but they become reliable measures one year prior to bankruptcy.

Our equivalent to CB's cash flow from operations measure includes three cash based funds flow components, namely, operations, working capital and fixed coverage expenses. The probit coefficients in Exhibit 5 for the three equivalent components corroborate CB's finding

that CFO does not provide a reliable signal for discriminating between failed and nonfailed companies. The distribution of these three CFO equivalents are presented in Figure 2. The graphics illustrate that the variance of the operating, working capital and fixed coverage components for the failed companies is markedly greater than for the financially healthy companies. There are failed companies that have CFO measures quite similar to nonfailed companies, and there are others that are totally dissimilar. Our findings also indicate it is not possible to use the CFO measures to discriminate between failed and nonfailed companies.

Ratios

CB found that a set of six accrual accounting based ratios provided more reliable information than CFO for classifying failed and nonfailed companies. Also previous bankruptcy studies have relied totally on financial ratios to predict bankruptcy. In order to determine if financial ratios are a more reliable source of information than the funds flow components, we selected seven ratios that most frequently predicted bankruptcy from fourteen previous studies, [3]. We also included a ratio for size and one for market value. These nine ratios are net income/total assets (NI/TA), total debt/total assets (TD/TA), cash flow/total debt (CF/TD), net working capital/total assets (NWC/TA), current assets/current liabilities (CA/CL), cash plus marketable securities/current liabilities (C/CL), natural log of total assets (ℓn TA), market value of equity/book value of equity (MVE/BVE).

When the twelve funds flow components and the nine ratios are combined, the probit results show that the dividends component is significant at the 5% level of confidence and the investment and receivables components are significant at the 10% level. None of the ratios are significant. The data used to calculate the ratios and funds flow components are from the one year before failure sample. The implication of this finding is that dividend, investment and receivable flows offer reliable information for discriminating between failed and nonfailed companies. They provide dependable signals for analysts and management to identify possible candidates for financial failure.

A strong discriminating test called the log likelihood statistic was used to determine if ratios provide additional discriminating information when combined with funds flow components or vice versa. We tested the nine ratios and the twelve funds flow components as a group. The results for both the ratios and the cash flow components were significant. When the nine ratios were added to the twelve funds flow measures, the increase in the explanatory power of the combined measures was significant at the 5% level. Adding the funds flow components to the nine ratios resulted in the combined discriminating power being significant at the 1% level. Although both measures provide additional discriminating information when they are combined, the funds flow components provide a slightly more reliable signal.

Conclusion

Our study supports the findings of Casey and Bartczak that cash flow from operations does not provide reliable signals for discriminating

between failed and nonfailed companies. CFO is not the bottom line for discriminating between financially healthy and bankrupt companies. We discovered that cash based funds flow model components or financial ratios provide management and analysts reliable signals for classifying failed and nonfailed companies. Our analysis shows when ratios are combined with funds flow measures, or vice versa, the discriminating reliability of the signal improves. However, the confidence level is higher with the addition of funds flow information. We discovered dividend, investment and receivable funds flow measures provide significant information in classifying failed and nonfailed companies. Thus CFO is not the bottom line, but a combination of funds flow and ratios with particular emphasis on dividends, investment and receivables funds flow components provide reliable information for judging the condition of a company's financial health.

REFERENCES

1. Edward I. Altman, "Financial Ratios, Discriminant Analysis and the Prediction of Corporate Bankruptcy," Journal of Finance, Vol. 23 (September 1968), pp. 589-609.

2. Cornelius Casey and Norman Bartczak, "Cash Flow--It's Not The Bottom Line," Harvard Business Review, forthcoming.

3. James A. Gentry, Paul Newbold and David T. Whitford, "Bankruptcy, Working Capital and Funds Flow," in Gerald H. Lawson and Richard Pike (editors), Management Finance in Working Capital, forthcoming in 1984.

4. Erich A. Helfert, Techniques of Financial Analysis, Fifth Edition, Homewood, IL: Richard D. Irwin, 1982, Chapter 1.

EXHIBIT 1. TREND OF FUNDS FLOW COMPONENTS
FOR DEERE & COMPANY AND MASSEY FERGUSON 1978-1982
(in percent)

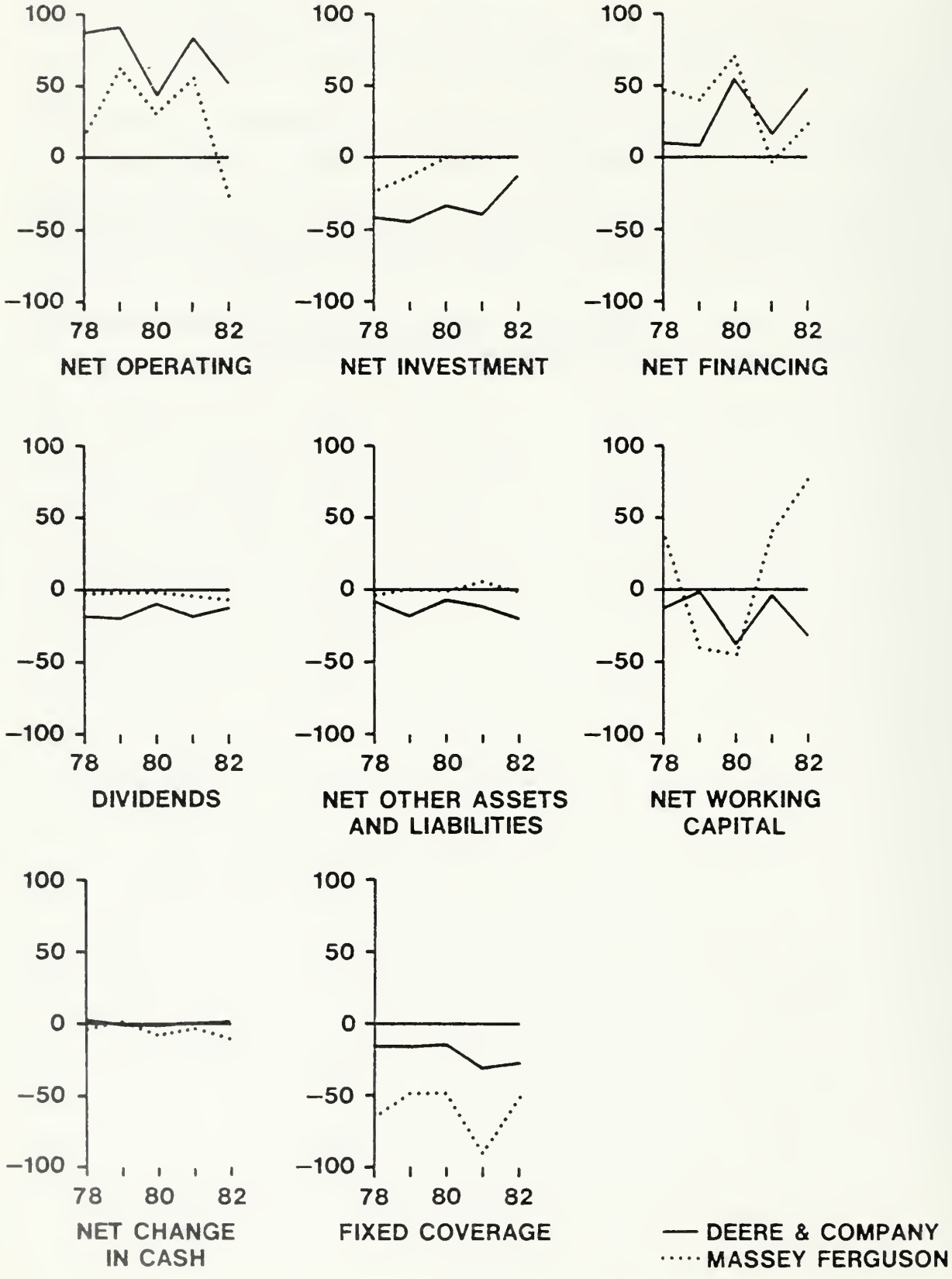


EXHIBIT 2. TREND OF SHORT-RUN FUNDS FLOW COMPONENTS FOR DEERE & COMPANY AND MASSEY FERGUSON 1978-1982
(in percent)

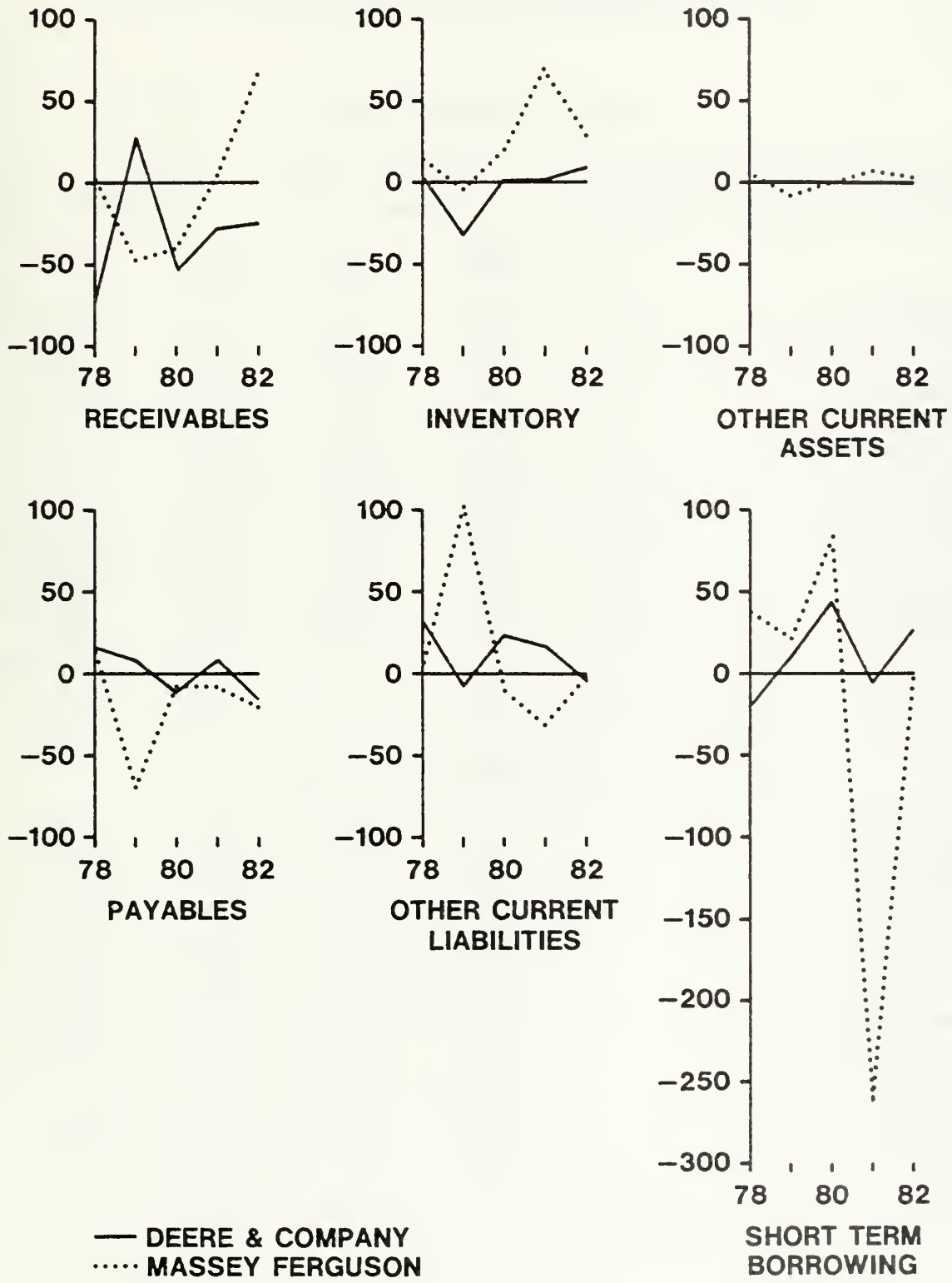


EXHIBIT 3

MEAN NET FUNDS FLOW COMPONENTS/TOTAL NET FLOW
FOR FAILED AND NONFAILED COMPANIES

ONE YEAR BEFORE FAILURE

Net Funds Flow Component/ Divided by Total Net Flow (TNF)	Group 1 Failed		Group 2 Nonfailed	
	Mean	S.D.	Mean	S.D.
Operations	.163	.528	.556	.247
Working Capital	.130	.453	-.129	.344
Other A&L	-.044	.258	.047	.178
Financing	.167	.490	.140	.369
Fixed Coverage	-.152	.127	-.080	.095
Investment	-.163	.288	-.367	.267
Dividends	-.018	.050	-.092	.103
Cash & M.S.	-.081	.290	-.074	.243
Receivables	.100	.351	-.169	.257
Inventory	.013	.485	-.126	.246
Other CA	.017	.148	-.020	.065
Payables	.170	.559	.101	.393
Other CL	-.172	.680	.085	.241
TNF/TA	.257	.140	.226	.025

MEAN OF VARIABLE FOR THREE YEARS BEFORE FAILURE

Operating	.288	.344	.588	.228
Working Capital	.007	.291	-.102	.197
Other A&L	-.018	.202	.029	.064
Financing	.120	.342	.090	.211
Fixed Coverage	-.126	.100	-.079	.062
Investment	-.220	.170	-.364	.211
Dividends	-.002	.049	-.093	.106
Cash & M.S.	-.029	.145	-.068	.108
Receivables	.013	.304	-.151	.195
Inventory	-.061	.211	-.117	.167
Other CA	-.002	.022	-.015	.032
Payables	.147	.260	.139	.212
Other CL	-.089	.389	.041	.250
TNF/TA	.255	.136	.219	.076

EXHIBIT 4

CLASSIFICATION MATRICES FOR FAILED AND NONFAILED COMPANIES USING PROBIT MODEL AND TWELVE FUNDS FLOW COMPONENTS

ONE YEAR BEFORE FAILURE

Probit (Pr < .5)	Number Correct	Percent Correct	Percent Error	N
Failed	26	78.8	21.2	33
Nonfailed	29	87.9	12.1	33
Total	59	83.3	16.7	66

THREE YEAR AVERAGE BEFORE FAILURE

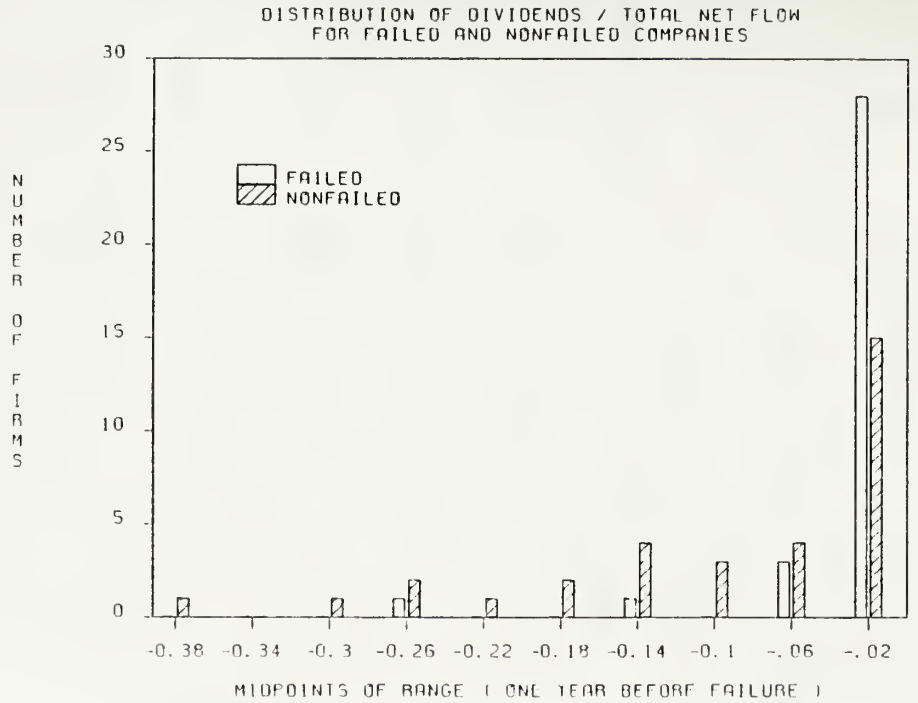
Probit (Pr < .5)				
Failed	26	78.8	21.2	33
Nonfailed	26	78.8	21.2	33
Total	52	78.8	21.2	66

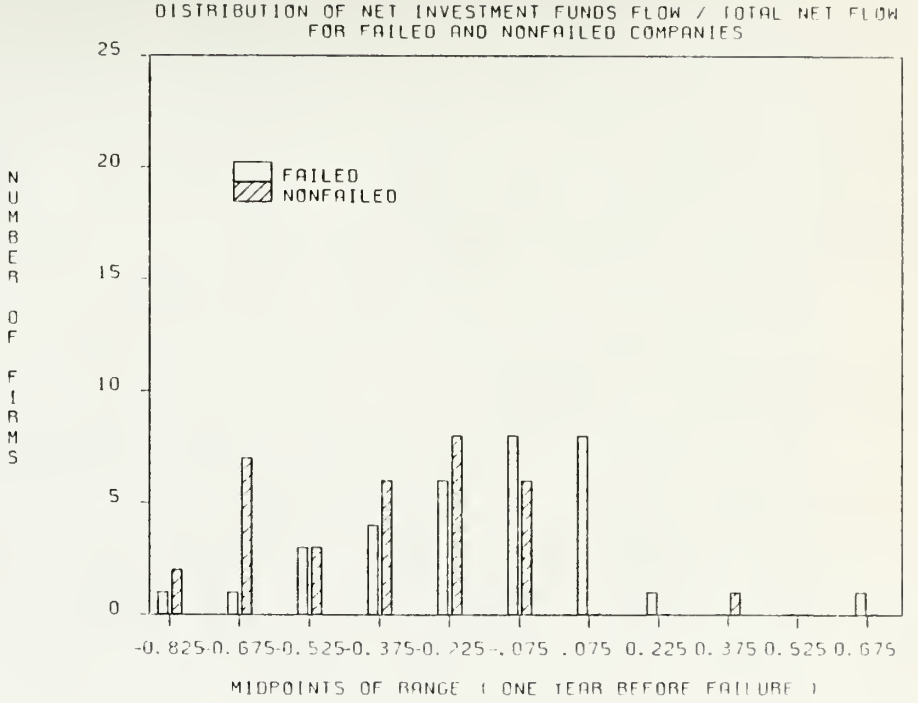
EXHIBIT 5

PROBIT COEFFICIENTS

Net Funds Flow Components Divided by Total Net Flow	One Year Before Failure	Three Year Average Before Failure
Constant	1.567	-.073
Operating	1.257	1.630
Other	-1.040	-6.094
Financing	1.580	-.008
Fixed Coverage	2.713	-2.041
Investment	3.678*	4.245
Dividend	13.133*	17.691*
Receivables	4.339*	3.656
Inventory	1.253	2.115
Other CA	2.490	4.532
Payables	2.086	2.649
Other CL	.56	-.470
Total Net Flow/ Total Assets	0.129	7.362*

*Asymptotic T ratio was significant at the .05 level of confidence


DISTRIBUTION OF DIVIDENDS / TOTAL NET FLOW
FOR FAILED AND NONFAILED COMPANIES
NUMBER OF FIRMS
FAILED
NONFAILED
30
25
20
15
10
5
0
-0.38 -0.34 -0.3 -0.26 -0.22 -0.18 -0.14 -0.1 -.06 -.02
MIDPOINTS OF RANGE (ONE YEAR BEFORE FAILURE)


DISTRIBUTION OF NET INVESTMENT FUNDS FLOW / TOTAL NET FLOW
FOR FAILED AND NONFAILED COMPANIES
NUMBER OF FIRMS
FAILED
NONFAILED
25
20
15
10
5
0
-0.825 -0.675 -0.525 -0.375 -0.225 -.075 .075 0.225 0.375 0.525 0.675
MIDPOINTS OF RANGE (ONE YEAR BEFORE FAILURE)

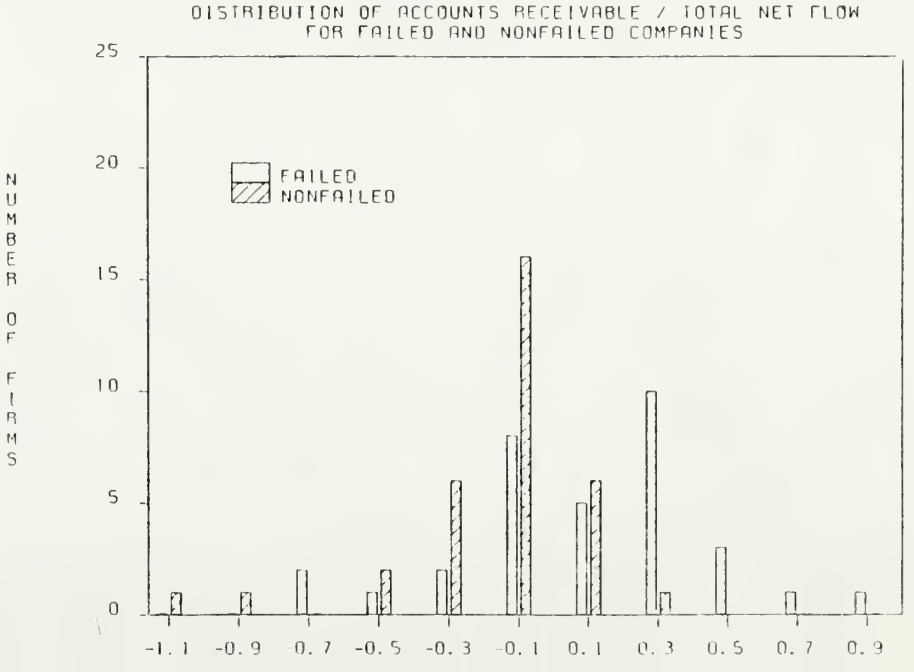
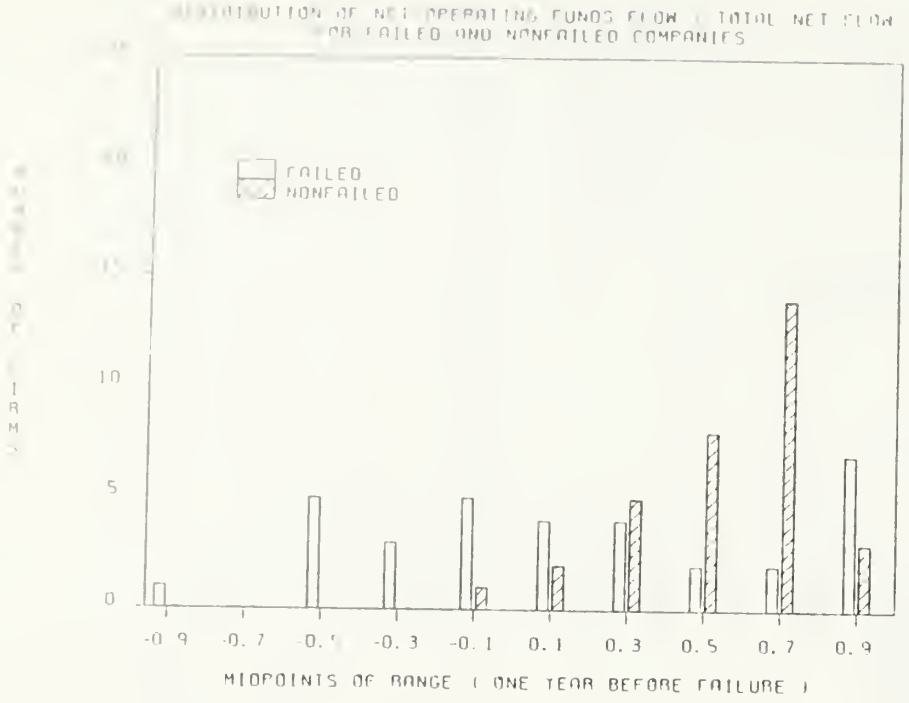
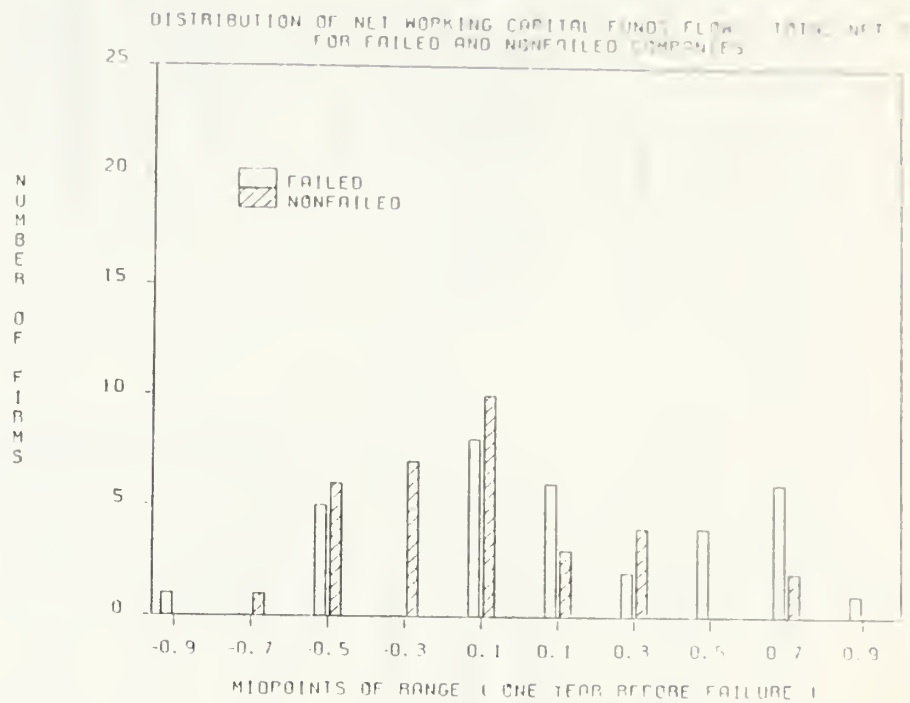
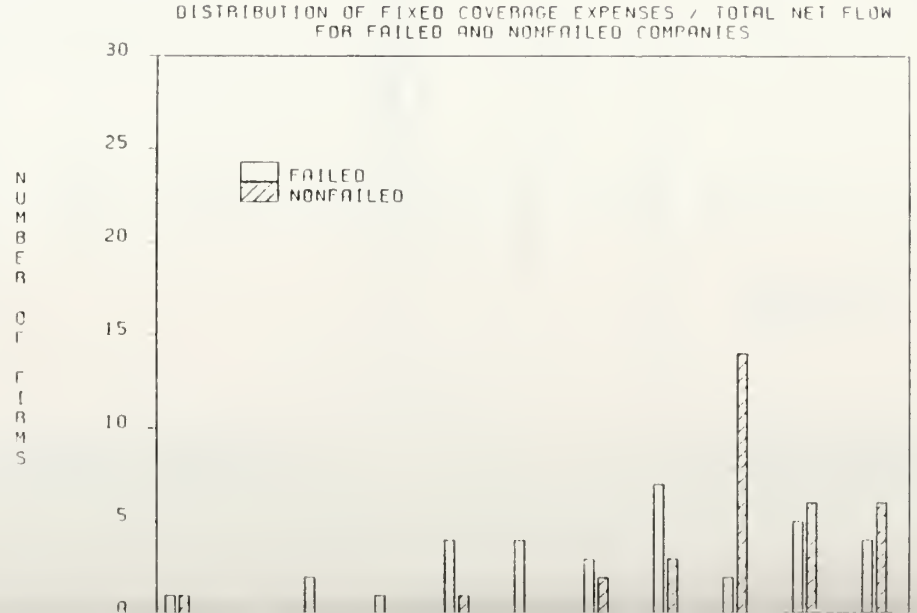

DISTRIBUTION OF ACCOUNTS RECEIVABLE / TOTAL NET FLOW
FOR FAILED AND NONFAILED COMPANIES
NUMBER OF FIRMS
FAILED
NONFAILED
25
20
15
10
5
0
-1.1 -0.9 -0.7 -0.5 -0.3 -0.1 0.1 0.3 0.5 0.7 0.9

FIGURE 2

FREQUENCY DISTRIBUTIONS OF FUNDS FLOW COMPONENTS FOR FAILED AND NONFAILED COMPANIES
THAT ARE THE EQUIVALENT OF THE CASEY AND BARTZCAK CASH FLOW FROM OPERATIONS







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